Problem Management

Fermilab Process and Procedure

Prepared for:

Fermi National Laboratory

June 12, 2009

GENERAL			
Description	This document establishes a Problem Management (PM) process and procedures for the Fermilab Computing Division. Adoption and implementation of this process and supporting procedures ensures the timely recovery of services and will minimize the adverse impact on business operations.		
Purpose	The purpose of this process is to establish a problem management (PM) process for the Fermilab Computing Division. Adoption and implementation of this process provides a structured method to seek and establish the root cause of incidents and to initiate actions to improve or correct the situation. This minimizes the adverse impact on operational ability of a business due to incidents and problems caused by errors within the IT infrastructure.		
Applicable to	*Problem Management process in support of the ISO20000 initiative.*		
Supersedes	*N/A*		
Document Owner	*Problem Manager*	**Owner Org**	*Computing Division*
Effective Dates	*07-01-2009 to 07-01-2010*	**Revision Date**	*06-14-2009*

VERSION HISTORY			
Version	**Date**	**Author(s)**	**Change Summary**
1.0	6/14/2009	Gerald Guglielmo, Problem Coordinators, David Whitten – Plexent LLP	Initial document

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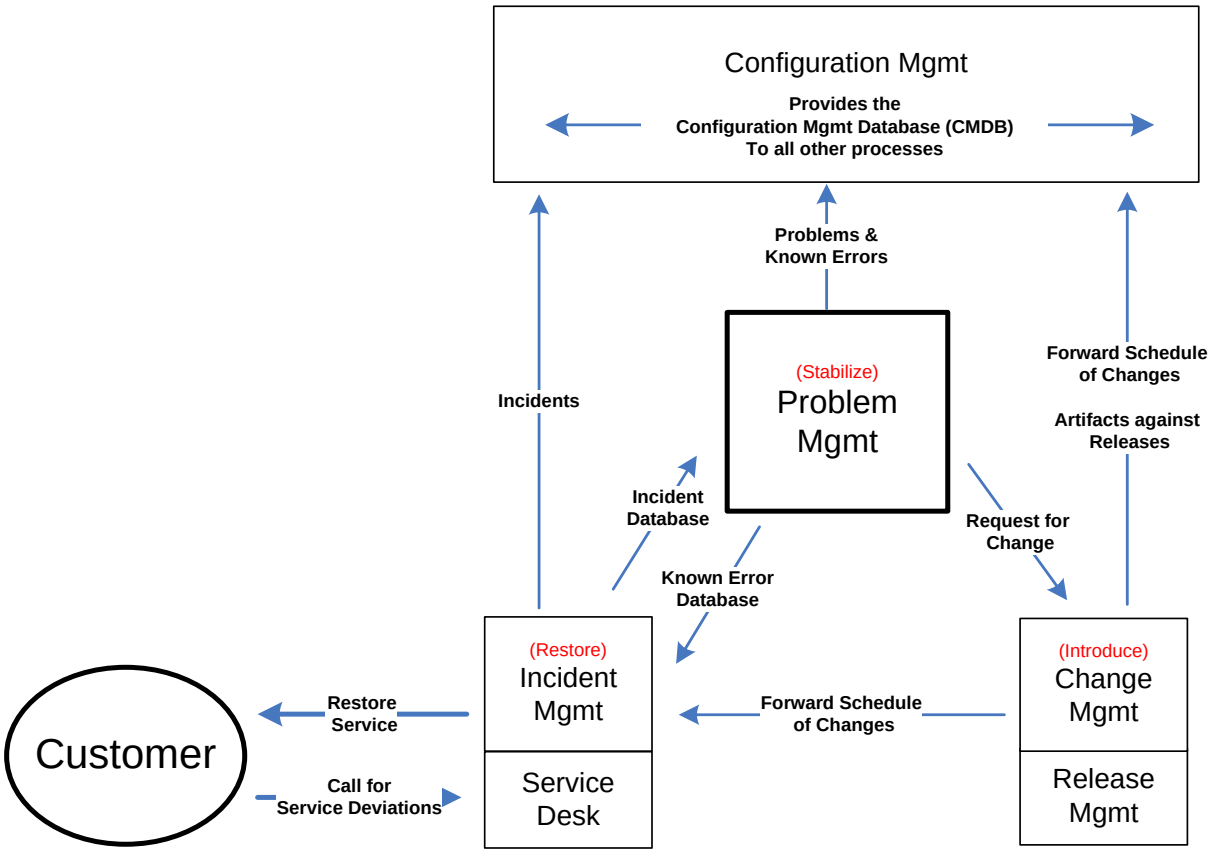
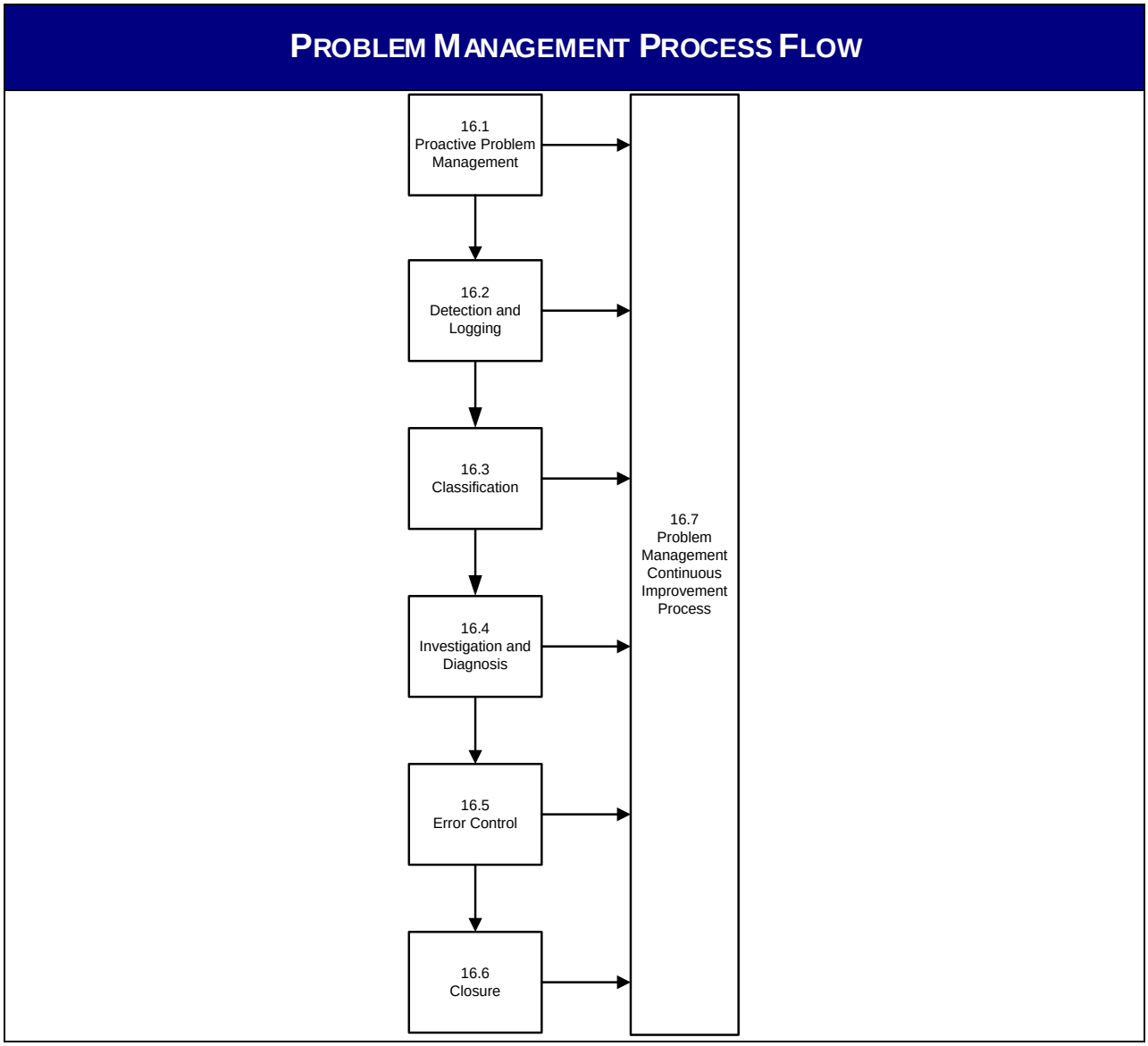
PROBLEM MANAGEMENT GOAL, BENEFITS	
Goal	To contribute to the mission of the laboratory by providing the highest possible levels of IT Service availability through minimization of the impact of Incidents and Problems within the environment by: • Proactive prevention of Incidents and Problems • Elimination of recurring Incidents • Understanding the root cause of Incidents so that corrective action can be undertaken
Benefits	Higher IT Service availability and user productivity, less disruption, reduced expenditure on fixes, and reduced costs in resolving repeat incidents as a result of the following Problem Management activities: • Proactive discovery and prevention of Incidents and Problems through trending analysis of ITSM data • Reactive discovery of the root cause of Incidents so that corrective action can be undertaken • A reduction over time in the number and impact of Problems and Known Errors through permanent resolution

PROBLEM MANAGEMENT

Process Context Diagram Interfacing Process Flow



NOTE: This graphic illustrates the basic interactions between Problem Management and the ITIL processes at a high level and does not represent detailed dependencies.



16 PROBLEM MANAGEMENT PROCESS ROLES AND RESPONSIBILITIES

Roles	Responsibilities
Problem Manager	• Receives Major Incident notification from Incident Management • Determines IT Services and CI's affected • Analyzes symptoms • Confirms Incident Report number • Confirms that Problem Management will engage with incidents as necessary • Selects the appropriate Service Support Providers who will respond to the Problem tickets. If a Known Error and matching Workaround exist, a decision should be made about whether this Workaround should be employed to resolve the Incident/Problem at this time. • Discusses the root cause analysis and Known Error • Discusses options for resolving the Known Error with Technical Experts and Finance team members • Documents options for resolution • Presents proposed Resolution options to Decision Authority • Discusses the proposed options in terms of risks, costs, timescales, etc. • Observes the implementation of the Request for Change and receive information on the outcome via the Release Management process • Decides whether the implemented Change has successfully resolved the Problem/Known Error • Discusses Problem Management's activities during the Major Incident • Take away Lessons Learned from the meeting • Passes information from the Major Incident Review to the Problem Coordinator so that necessary updates can be made to the Problem Record, Workaround, Known Error • Applies Lessons Learned to the Problem Management process as necessary • Decides on course of action
Problem Coordinator	• Receives request from **Problem Manager** to partake in Problem Management response to the Major Incident

16 PROBLEM MANAGEMENT PROCESS ROLES AND RESPONSIBILITIES

Roles	Responsibilities
	• Gathers the data collected to date by Incident Management • Analyzes the data collected from various sources relating to the Major Incident • Analyzes historical data to see whether a new Problem Record needs to be created or whether an existing Problem Record needs to be updated or reopened and updated • Undertakes any necessary actions to create a Problem Record • Uses agreed trending analysis techniques on data in the Problem Management System, Incident Management System, and Configuration Management Data Base to uncover trends • If a Problem Record has been created as a result of a Major Incident, logs the Incident Records that have been created by the Service Desk in the Problem Record • If a Problem Record has been created as a result of proactive Problem Management trending analysis, logs the Incident Records that have been created by the Service Desk in the Problem Record • Using established criteria, attaches a category code to the Problem Record • Using established criteria, attaches a Priority to the Problem Record • Verifies that an appropriate Technical Expert has been assigned the Problem • Undertakes an investigation into the Problem using documented techniques • Using the root cause analysis data, completes the Problem diagnosis and documents results in the Problem Record • Verifies whether there is already a Known Error and matching Workaround in the Knowledge Management System that relates to this Problem type • Takes the results of the root cause analysis and documents the Known Error in the Knowledge Management System • Updates the Problem Record to indicate the Known Error has been documented noting it's reference number • If necessary updates the Incident Record

16 PROBLEM MANAGEMENT PROCESS ROLES AND RESPONSIBILITIES

Roles	Responsibilities
	• Creates a link from all existing Incident and Problem Records to the Known Error in the Knowledge Management Database • Discusses the root cause analysis and Known Error • Discusses options for resolving the Known Error with **Technical Experts** and **Finance team members** • Documents options for resolution • Creates a Workaround that allows users to bypass or mitigate the Known Error • Tests the Workaround • Gains Approval for the Workaround • Documents the Workaround • Associates Problem Records in the Problem Management System to the Workaround • Associates Known Errors in the Knowledge Management System to the Workaround • Communicates the Workaround • Confirms with users that the Workaround is working • Decides whether the Workaround will provide an ongoing fix to the Known error or whether the impact and severity of the Error are so severe that the costs of a permanent fix via a RFC are justified • Generates a Request for Change (RFC) intended to permanently resolve the Problem/Known Error • Submits the RFC through the Change Management process • Makes necessary updates to the Problem Record • Makes necessary updates to the Known Error record • Takes the information provided to the **Problem Manager** at the Major Problem Review and makes necessary updates to the Problem Record, Workaround, Known Error • When all necessary updates have been made to the Problem Record, reviews for accuracy and then closes the Problem Record • Generates Reports and Management information as necessary

16 PROBLEM MANAGEMENT PROCESS ROLES AND RESPONSIBILITIES

Roles	Responsibilities
Technical Expert	• Assists Problem Coordinator in an investigation into the Problem using documented techniques, and in Root Cause Analysis • Creates a Workaround that allows users to bypass or mitigate the Known Error • Tests the Workaround • Gains Approval for the Workaround • Documents the Workaround • Confirms with users that the Workaround is working • Decides whether the Workaround will provide an ongoing fix to the Known error or whether the impact and severity of the Error are so severe that the costs of a permanent fix via a RFC are justified • Proposes options for resolution of the Problem • Observes the implementation of the Request for Change and receives information on the outcome via the Release Management process • Decides whether the implemented Change has successfully resolved the Problem/Known Error
Change Manager	• Observes the implementation of the Request for Change and receives information on the outcome via the Release Management process
Customer	• Decides whether the implemented Change has successfully resolved the Problem/Known Error

16 Problem Management RACI Matrix

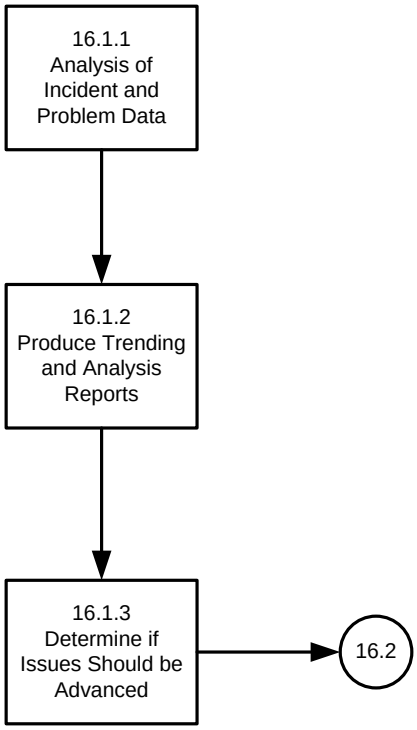
Process Name	*Problem Management*

R - Responsible	Person responsible for getting the work done
A - Accountable	Only one person can be accountable for each activity
C - Consult	The people who are consulted and whose opinions are sought
I - Inform	The people who are kept up-to-date on progress

Primary Roles in Process
Primary Interactions
Secondary Roles

Procedure Activities	Problem Manager	Problem Coordinator	Technical Expert	Incident Manager	Subject Matter Expert	User	Vendor	Change Manager	Ser Le Man
16.1 Proactive Problem Management									
16.1.1 Analysis of Incident & Problem Data	A	R	C	C	C	C	C	C	
16.1.2 Produce Trending and Analysis Reports	A	R		I					
16.1.3 Determine if Issues Should be Advanced	A	R		I					
16.2 Detection & Logging									
16.2.1 Problem Detection	A	R	R	I					
16.2.2 Problem Logging	A	R	C	I					
16.2.3 Associate Records	A	R							
16.3 Categorization & Prioritization									
16.3.1 Problem Classification	A	R	C	I	C				
16.3.2 Problem Prioritization	A	R		C		C			
16.4 Investigation & Diagnosis									
16.4.1 Problem Investigation	A	R	R		C		C		
16.4.2 Problem Diagnosis	C	R	C	I	C	I	C	C	
16.5 Error Control	A/R	R	C	I	C	C	C	I	
16.5.1 Workaround	R	R	C	I					
16.5.2 Create Known Error Record	A	R							
16.5.3 Associate Records	A	R							
16.5.4 Plan Resolution(s)	R	R							
16.5.5 Document Workaround	A	R	R	I					
16.5.6 Document RFC(s)	A	R						C	
16.6 Problem Closure									
16.6.1 Resolution	R		R					C	
16.6.2 Major Problem Review	A/R	C	C	C	C		C	C	
16.6.3 Update Problem Record	A	R	C	I					
16.6.4 Close Problem Record	A	R	I	I					
16.6.5 Management Reporting	A	R		I					

16.1 PROACTIVE PROBLEM MANAGEMENT PROCEDURE



16.1 PROACTIVE PROBLEM MANAGEMENT BUSINESS PROCEDURE RULES	
Inputs	• Monitoring Events • Incidents
Entry Criteria	• Regularly-scheduled proactive Problem Management trending analysis activity is due • A request to undertake trend analysis has been received • Suspicion that a Problem exists has been communicated and requires ad hoc analysis
General Comments	The purpose of this procedure is to proactively identify problems to reduce the occurrence of repeating incidents and first time incidents.

16.1 PROACTIVE PROBLEM MANAGEMENT PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
16.1.1 Analysis of Incident and Problem Data	Problem Coordinator	Analyze incident, problem, and (known) error data to produce management information and identify underlying problems. **Identify trends by considering these types of questions:** • Is the number of incidents of a particular type increasing? • Is the number of incidents within a particular site increasing? • Is the number of incidents involving a particular CI or service increasing? • Is the number of unresolved incidents increasing? • Is the number of incidents by status changing? • Are there indicators of trouble in lab critical areas? • Are there observed patterns that indicate hidden problems?

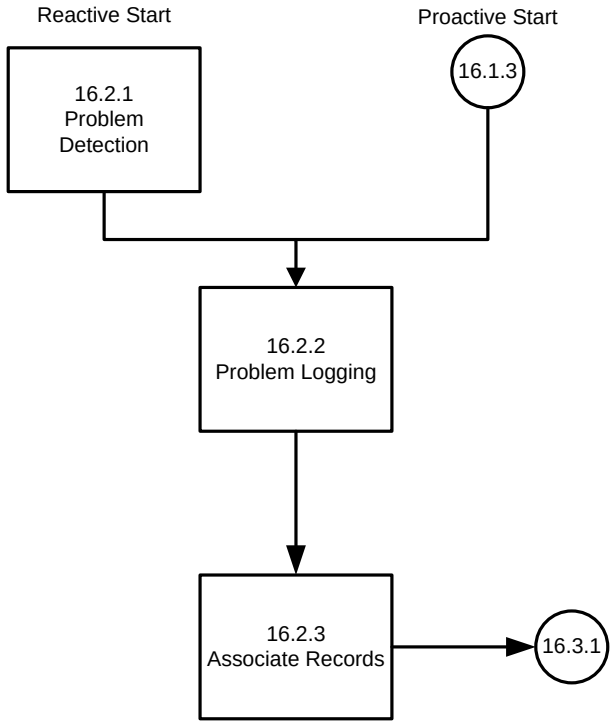
16.1 PROACTIVE PROBLEM MANAGEMENT PROCEDURE NARRATIVE

Step	Responsible Role	Action
16.1.2 Produce Trending and Analysis Reports	Problem Coordinator	**Produce Trending and Analysis reports including:** • Change of pattern in number of incidents of a particular type, site, Configuration Item (CI) or Asset • Trend analysis of the number of incidents by status • Review of indicators of trouble in lab critical areas • Reasoning which describes patterns that indicate hidden problems • Other appropriate information as deemed necessary • Include recommendations as to whether a problem should be opened or not May designate issues for immediate advancement
16.1.3 Determine if Issues Should be Advanced	Problem Manager/Problem Coordinator	**Determine if trend or systemic issues should be advanced to a Problem. This may be in conjunction with the other Problem Coordinator or the problem manager.** Questions to consider: • Is there an increase in Incidents for a particular issue that is not already identified as a Problem or Known Issue? • Was there a significant impact to the Service Desk from multiple incidents that was not already captured as a Problem, but needs investigation to prevent similar occurrences? • Will a root cause analysis and solution produce a possible benefit large enough to warrant the cost of an Investigation, Diagnosis, and possible RFCs? • Is the potential problem in question repeatable or likely to happen again, for which an analysis and solution may prevent a future outage?

Outputs	Identified Problems
Exit Criteria	Problem Management team engaged

16.1 PROACTIVE PROBLEM MANAGEMENT RISKS	
Risk	**Impact**
Analysis not undertaken	Problem Management is only engaged in reactive duties (i.e. engagement by Incident Management) and not proactive duties. This could mean missing Problems and Known Errors that would be uncovered by trend analysis along with an opportunity to erase these from the environment.
Inadequate analysis	Creation of spurious problems, reducing staff efficiency. Failure to identify problems and take the necessary corrective action

16.2 Problem Management Detection and Logging Procedure



16.2 PROBLEM MANAGEMENT DETECTION AND LOGGING BUSINESS PROCEDURE RULES	
Inputs	• Identified Problems • Major Incident record • Multiple Incidents • Known Error information from external source • Known Error information from Release Management
Entry Criteria	• Proactive Trend Analysis has been completed • Problem Management team engaged in support of a Major Incident • Major Incident notification received from Incident Management
General Comments	The purpose of this procedure is to detail the steps necessary to complete the Problem Detection and Logging process for the Fermilab Computing Division.

16.2 PROBLEM MANAGEMENT DETECTION AND LOGGING PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
16.2.1 Problem Detection	Problem Manager, Problem Coordinator	Involves one or more of the following: • Receives Major Incident notification from Incident Management • Determines IT Services and CIs affected • Gathers the data collected to date by Incident Management • Analyzes symptoms • Analyzes the data collected from various sources relating to the Major Incident • Confirms Incident Report number • Confirms that Problem Management will engage • Selects the appropriate Service Support team who will respond to the Problem and verifies that an appropriate team member(s) has been assigned • Analyzes historical data to see whether a new Problem Record needs to be created or whether an existing

16.2 Problem Management Detection and Logging Procedure Narrative

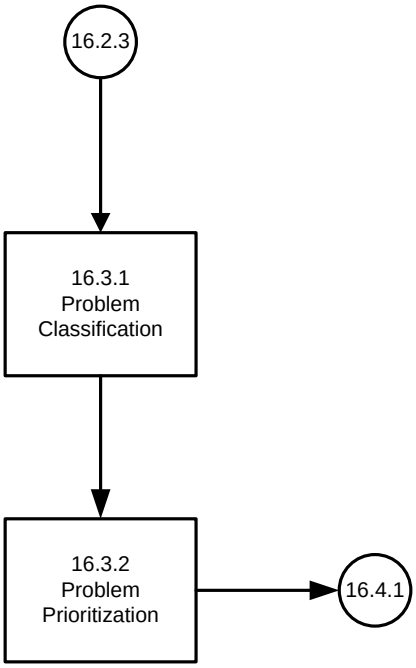
Step	Responsible Role	Action
		Problem Record needs to be updated or reopened and updated • Updates the Incident Record if necessary/appropriate
16.2.2 Problem Logging	Problem Manager, Problem Coordinator, Technical Expert	Undertakes any necessary actions to create a Problem Record. This involves creating a new record in the Problem Management System (information from the Major Incident Record may need to be copied across from the Incident Management System – this may be automated if an integrated tool suite is in use). The type of information that may be captured includes: • Unique identifier, Date and time stamps • Name and contact information of the Problem initiator • Incident count/linking incidents • Linked RFCs • Problem details/description • Problem category • Priority • Service and SLAs affected • Links to further information • History/ Details of all diagnostic or attempted recovery actions taken • Status • Workarounds • Permanent solution If it is ascertained that this is a repeat Problem, a new Problem Record can be created, or an existing Problem Record can be updated, or an existing closed Problem Record may need to be reopened depending on the nature of the Problem and the length of time since it last occurred.

16.2 Problem Management Detection and Logging Procedure Narrative		
Step	**Responsible Role**	**Action**
16.2.3 Associate Records	Problem Coordinator	• If a Problem Record has been created as a result of a Major Incident, or by a Technical Expert, link the Incident Records that have been created by the Service Desk to the Problem Record using existing tool functionality • If a Problem Record has been created as a result of proactive Problem Management trending analysis, links the Incident Records that have been created by the Service Desk to the Problem Record using existing tool functionality • If a Problem Record has been created by a Technical Expert, review and associate the ticket with existing Problem Records if possible.

Outputs	• Analyzed/Updated Major Incident data • Updated Problem Record
Exit Criteria	A new Problem Record has been created or an existing Problem Record has been updated

16.2 Detection and Logging Risks	
Risk	**Impact**
If Problem Management is not engaged by Incident Management	Incidents will be resolved without root cause being investigated and understood
If Problem Records are not generated	The opportunity to learn about the root cause of Incidents is lost, the Incidents are never permanently resolved and keep being re-reported to the Service Desk
Problem Record not created	Organization misses the opportunity to investigate and drive Known Errors out of the environment. These would keep being re-reported to the Service Desk using resources unnecessarily each time.
Records not associated	Records that “fall through the gap” continue to be treated as separate events taking up resources and duplicating effort

16.3 Problem Management Categorization and Prioritization Procedure



16.3 PROBLEM MANAGEMENT CATEGORIZATION AND PRIORITIZATION BUSINESS PROCEDURE RULES	
Inputs	• Analyzed/Updated Major Incident data • Updated Problem Record
Entry Criteria	• A Problem Record has been created or updated
General Comments	The Priority level in will dictate the resources attached to the Problem by Problem Management The Priority level will also dictate the timeliness of actions associated with the Problem as documented in SLAs/OLAs. These may include timeliness of communications, updates to the Problem Record, Workaround creation, permanent resolution proposals, etc.

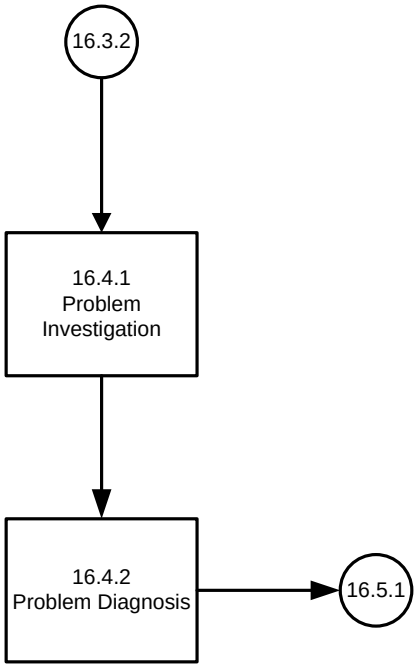
16.3 PROBLEM MANAGEMENT CATEGORIZATION AND PRIORITIZATION PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
16.3.1 Problem Classification	Problem Coordinator	Using established criteria, a category code is attached to the Problem Record
16.3.2 Problem Prioritization	Problem Coordinator	Using established criteria a Priority is attached to the Problem Record. In addition to the information above, these criteria could also include: • Duration of Problem to date • Impact (cost) to date • Whether the system can be recovered, or whether it needs to be replaced • How much it will cost to fix • How long it will take to fix the Problem • How extensive the Problem is • See IM Appendix 11 for further criteria in determining urgency and impact

Outputs	• Updates to IM/PM Tool • Categorized and Prioritized Problem Record
Exit Criteria	Problem is categorized and prioritized

16.3 Categorization and Prioritization Risks

Risk	Impact
Incorrect Categorization	Inaccurate reporting Inaccurate attempts at root cause analysis
Incorrect Prioritization	Inappropriate level of attention and resources applied to the Problem

16.4 Problem Management Investigation and Diagnosis Procedure



16.4 PROBLEM MANAGEMENT INVESTIGATION AND DIAGNOSIS PROCEDURE RULES	
Inputs	• Incident information • Change information • Problem Records
Entry Criteria	• A Categorized and Prioritized Problem Record
General Comments	The purpose of this procedure is to detail the steps necessary to complete the problem investigation and diagnosis process for the Fermilab Computing Division.

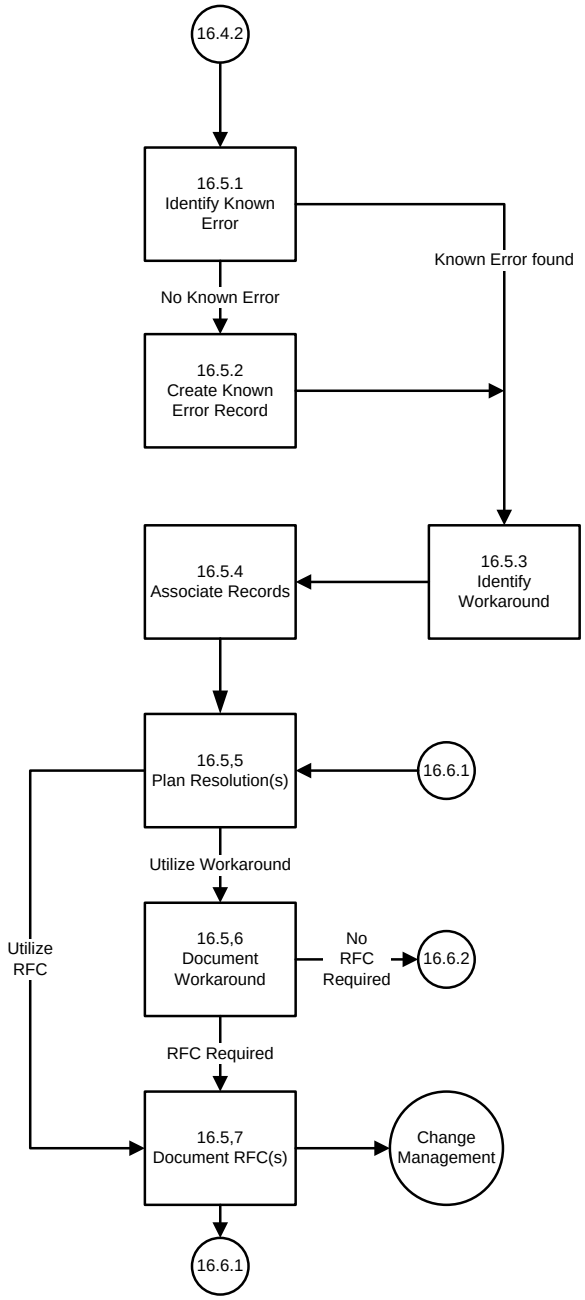
16.4 PROBLEM MANAGEMENT INVESTIGATION AND DIAGNOSIS PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
16.4.1 Problem Investigation	Technical Expert, Problem Coordinator, Problem Manager	Problem analysis to identify the root cause, workarounds, and potential solutions to the problem should include: • Identify the team as necessary. • Using tools as available, document findings and store evidence into the Problem Management tool. • Review standard Operational Level Agreements (OLAs) and monitor progress. • As necessary, utilize problem analysis techniques, such as Ishikawa diagrams, Kepner-Tregoe, Flow diagrams, other analysis methodologies as needed.
16.4.2 Problem Diagnosis	Technical Experts Problem Coordinator Problem Manager	• Determine if a Problem can be associated with a Known Error. Possibilities to note include: ○ Root Cause and CI is known ○ There is a possibility of a recurrence • Identify workarounds. • Determine Root Cause(s) and record in data record. • Assess the problem and recommend action to resolve problem. • Record details in data record • Update Knowledge Base

Outputs	Updated Problem Record
Exit Criteria	Workaround, Root Cause or Known Error identified

16.4 Problem Management Investigation and Diagnosis Risks

Risk	Impact
Problem not investigated	Root cause not understood, Problem cannot be fully investigated and resolved. Continued inefficiency.
Problem diagnosis not captured	Future need to re-analyze similar problem. Wasted effort. Permanent resolution not achieved.
Incorrect diagnosis captured	Root cause not understood. Incorrect resolution attempts. Wasted effort. Permanent resolution not achieved.

16.5 PROBLEM MANAGEMENT ERROR CONTROL PROCEDURE



16.5 PROBLEM MANAGEMENT ERROR CONTROL PROCEDURE RULES

16.5 PROBLEM MANAGEMENT ERROR CONTROL PROCEDURE RULES	
Inputs	• Root Cause data • Diagnosed Problem Record • Financial Information
Entry Criteria	A Problem Record with root cause analysis undertaken and Diagnosis completed
General Comments	A Workaround is a temporary means of resolving and overcoming the symptoms of an Incident. However, even if a Workaround is found, it is still important to work on a permanent resolution. When a Workaround is identified, the Problem Record still remains open and the details of the Workaround are recorded in the Problem Record (and the Known Error Database or Knowledge Management System) and communicated to Service Desk personnel. A Known Error record must be created and saved in the Knowledge Management System or Known Error Database once diagnosis is complete. This is so that further occurrences of Incidents and/or Problems can be more easily identified and linked together, and so that necessary actions can quickly be undertaken.

16.5 PROBLEM MANAGEMENT ERROR CONTROL PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**

16.5.1 Identify Known Error	Problem Coordinator
	Problem Manager
		Problem Coordinator
		• Verifies whether there is already a Known Error and matching Workaround in the Knowledge Management System that relates to this Problem
		• Reports findings to **Problem Manager**
		
		Problem Manager (and others if necessary)
		• If a Known Error and matching Workaround exist, a decision should be made about whether this Workaround should be employed to resolve the Incident/Problem at this time.
		  • If no Known Error is in place, proceed to procedure 16.5.2
		  • If Known Error is in place , proceed to procedure 16.5.3
		  • If Workaround in place is approved for use

16.5 PROBLEM MANAGEMENT ERROR CONTROL PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
		with this Problem, communicate this fact to necessary parties (Service Desk etc.) and proceed to procedure 16.5.3
16.5.2 Create Known Error Record	Problem Coordinator	• Using the results of the root cause analysis, document the Known Error in the Knowledge Management System • Update the Problem Record to indicate the Known Error has been documented noting it's reference number • If necessary update the Incident Record(s) and ensures communication to the Service Desk
16.5.3 Identify Workaround	Problem Coordinator	• Determine if work around exists for the known error • If not, develop a workaround if possible and record in the Known Error record • Determine suitability of workaround
16.5.4 Associate Records	Problem Coordinator	• Creates a link from all existing Incident and Problem Records to the Known Error in the Knowledge Management System

16.5 Problem Management Error Control Procedure Narrative

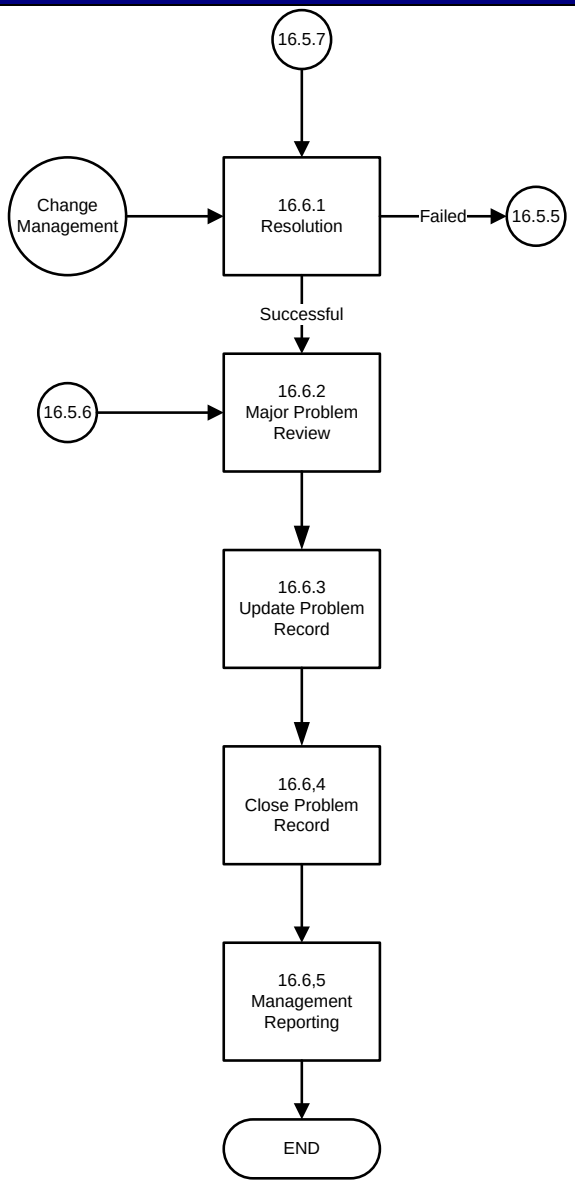
Step	Responsible Role	Action
16.5.5 Plan Resolution(s)	Problem Coordinator, Technical Expert	**Technical Expert** and **Problem Coordinator** • Discuss the root cause analysis and Known Error • Discuss options for resolving the Known Error with the team • Document options for resolution. These could include a temporary Workaround, creating a Request for Change to permanently resolve the Known Error, or both. Risks of performing actions, of not performing actions, of costs, and estimated timescales should all be documented so that the Problem Coordinator is able to balance all facts in making the final decision **Problem Manager/Coordinator** • Discusses the proposed options in terms of risks, costs, timescales, etc. Decides on course of action • If a workaround will be utilized go to 16.5.6 • If a Workaround will not be utilized but a Request for Change will, proceed to procedure 16.5.7

16.5 PROBLEM MANAGEMENT ERROR CONTROL PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
16.5.6 Document Workaround	Problem Coordinator Technical Expert	**Problem Coordinator** and **Technical Expert** • Create a Workaround that allows users to bypass or mitigate the Known Error • Test the Workaround • Publish the Workaround • Document the Workaround in the Knowledge Management System • Associate Problem Records in the Problem Management System to the Workaround • Associate Known Errors in the Knowledge Management System to the Workaround • Communicate the Workaround • Confirm with users that the Workaround is working • If an RFC is also required, proceed to procedure 16.5.7 • If no RFC is required, proceed to Procedure 16.6.2
16.5.7 Document RFC(s)	Problem Coordinator Technical Expert	• Generates a Request for Change (RFC) intended to permanently resolve the Problem/Known Error • Submits the RFC through the Change Management process

Outputs	• Updated Problem Record • Known Error documented • Work around documented • Request For Change
Exit Criteria	• Workaround identified • RFC generated to Change Management, if change leading to permanent resolution can be identified

16.5 PROBLEM MANAGEMENT ERROR CONTROL RISKS	
Risk	**Impact**
An existing Workaround is not recognized and the Problem continues to be investigated	Wasted time and resources, unnecessary extended outages
Known Error record not created	Subsequent reports of the Incident/Problem at the Service Desk will not be associated with the Known Error and investigated independently wasting time and resources and leading to unnecessary extended outages
Incidents and Problems not associated to a Known Error	When reported to the Service Desk the newly reported Incidents and Problems are investigated independently leading to wasted time and resources and potentially extended outages
No resolution options are documented	The Problem will remain, leading to extended or repeated outages, until an option is agreed
Too few resolution options are documented	A full cost/benefit analysis cannot be performed without all appropriate options having been documented
No Workaround documented	Incident Management would need either to re-develop the same workaround for each similar incident, or to informally remember the workaround used. Incident will remain alive, causing user difficulties and requiring Incident Management attention, until at least a temporary workaround is available.

16.6 PROBLEM MANAGEMENT CLOSURE PROCEDURE



16.6 PROBLEM MANAGEMENT CLOSURE PROCEDURE RULES	
Inputs	• Incident Data • Problem Data • Known Error data • Workaround data • Root Cause Analysis • Resolution options • Request(s) For Change
Entry Criteria	Implemented RFC in support of permanently resolving a Known Error; or Implemented Workaround without an associated RFC
General Comments	When a Major Problem occurs, a Major Problem Review must be held as soon as possible thereafter. The Major Problem Review is an opportunity to examine: • Things that were done correctly • Things that were done incorrectly • Items that can be improved in the future • How to prevent reoccurrence • Whether or not a third-party is responsible • Whether follow-up actions are required No review is required for minor problems

16.6 PROBLEM MANAGEMENT CLOSURE PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
16.6.1 Resolution	Problem Manager Technical Expert Change Manager	**Problem Manager**, **Technical Expert**, and **Change Manager** • Observe the implementation of the Request for Change and receive information on the outcome via the Release Management process **Problem Manager**, **Technical Expert**, and **Customer** • Decide whether the implemented Change has successfully resolved the Problem/Known Error • If YES, ensure any necessary communications are undertaken. Proceed to procedure 16.6.2

16.6 Problem Management Closure Procedure Narrative

Step	Responsible Role	Action
		• If NO and the service is no longer used, then proceed to 16.6.2If NO, subsequent research will need to be undertaken; the Workaround will need to remain in effect and necessary communications undertaken. Resume process at procedure 16.5.5 **Problem Coordinator** • Makes necessary updates to the Problem Record • Makes necessary updates to the Known Error record and Workaround documentation
16.6.2 Major Problem Review	Problem Manager	If minor problem, proceed to 16.6.3 Discusses Problem Managements activities during the Major Problem that the review is discussing, including: • Incident data provided to Problem Management • Problem data • Known Error data • Workaround data • Root Cause Analysis information • Proposed resolution options • Request(s) For Change • The operation of the process Takes away Lessons Learned from the meeting which could include: • Process improvement recommendations for support processes and ITIL processes
16.6.3 Update Problem Record	Problem Manager Problem Coordinator	• Make necessary updates to the Problem Record, Workaround, Known Error • Problem Manager applies Lessons Learned to the Problem Management process as necessary

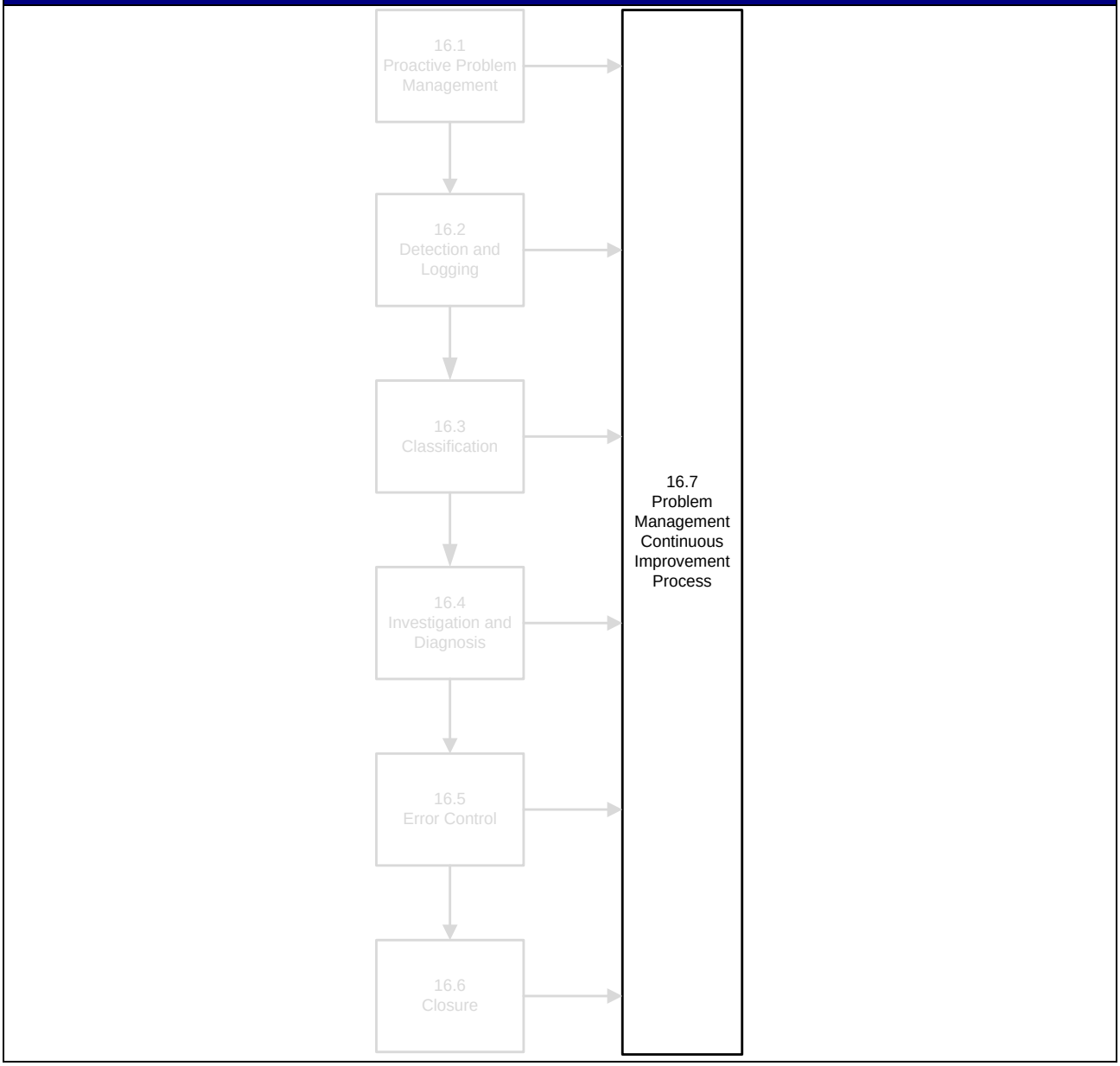
16.6 Problem Management Closure Procedure Narrative

Step	Responsible Role	Action
16.6.4 Close Problem Record	Problem Coordinator	• Assigns appropriate closure code. • When all necessary updates have been made to the Problem Record, reviews for accuracy and then closes the Problem Record • Informs Incident Management (and update the Knowledge Base) of the problem closure so that all linked incidents receive the appropriate attention to ensure their proper closure.
16.6.5 Management Reporting	Problem Manager Problem Coordinator	Generates and disseminates Reports and Management Information as necessary

Outputs	• Lessons Learned • Updated Knowledge Base • Closed Problem Record • Closed Incident Record(s) • Management Information (reports)
Exit Criteria	Closed Problem and Incident Record(s)

16.6 Problem Management Closure Risks	
Risk	**Impact**
Planned resolution fails	Problem/Known Error will be ongoing. Another attempt at resolution will need to be undertaken. Extended outages will result.
Major Problem Review not held	Opportunities for process improvement lost
Problem Record not updated as necessary	A full account of the entire history of the Problem is not maintained, reporting is inhibited, action items may be lost, potential for process improvement may be lost
Problem Record not closed	Assumption that it is ongoing and requires action leading to unnecessary work
Reports not disseminated	Management unable to act on contents

16.7 Problem Management Continuous Improvement Process Flow



16.7 CONTINUOUS IMPROVEMENT PROCESS BUSINESS PROCEDURE RULES	
Inputs	• Trending reports • Process reports • Problem Review Reports
Entry Criteria	• Regularly-scheduled proactive Problem Management trending analysis activity • Process reports indicate a need for improvement in the process itself • Problem Review Reports indicate a Problem Management process failure
General Comments	The purpose of this procedure is to proactively identify issues with the Problem Management process itself and to make needed corrections in conjunction with Service Level Management.

16.7 CONTINUOUS IMPROVEMENT PROCESS PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
16.7 Analysis of Incident and Problem Data	Problem Manager Problem Coordinator	**Produce Trending and Analysis reports to relate potential problems or problem successes to the incident environment.** The success of Problem Management is demonstrated by: • The reduction in the number of incidents within a given category. • The reduction of time needed to resolve incidents. • Decrease of other costs incurred associated with resolution. Problem Management reports shall consider, but not be limited to, the following subjects: • **Effectiveness of Problem Management**: details about the number of incidents, before and after solving a problem, recorded problems; number of Request for Changes (RFCs) raised, and resolved known errors. • **Relationship between reactive and proactive Problem Management**: increasing proactive intervention instead of reacting to incidents shows an increasing maturity of the process. • **Quality of the products being developed**: products handed over from the development environment should be of a high quality; otherwise they will introduce new problems. Reports about new products and their known

16.7 CONTINUOUS IMPROVEMENT PROCESS PROCEDURE NARRATIVE		
Step	**Responsible Role**	**Action**
		errors are relevant for quality monitoring. • **Status and Action Plans for open problems**: summary of what has been done so far, and what will be done next to advance top problems, including planned RFCs and required time and resources. • **Proposals to improve Problem Management.** If the information about the above factors indicates that the process does not comply with the objectives, then proposals may be made for recording, investigation, proactive activities, and other processes as necessary. Regular process audits may be carried out to the plan for continual process improvement.

Outputs	• Lessons Learned • Problem Management Service Improvement Project (SIP) • Problem Management requirements document • Action plans for improving Problem Management • Management Information (reports)
Exit Criteria	Action plan for performing a Service Improvement Project or a decision to not change the process.

16.7 PROBLEM MANAGEMENT CONTINUOUS IMPROVEMENT RISKS	
Risk	**Impact**
Problem Management processes are not reviewed on a regular basis	Problem Management fails to meet the need of Fermilab
Quality of products resulting from Problem Management process	Problem Management becomes stale and no longer serves the interest of Fermilab Computing Division.
Status and Action Plans not developed or followed through	Failure to actively manage the Problem Management process will result in a reintroduction of Problems into the operational environment

POTENTIAL PROBLEM MANAGEMENT PROCESS MEASUREMENTS (KPIS)

Select 3 or 4 of these KPI's that best fit the organizational requirements for measuring performance. As the organization and process matures, the selected KPI's are likely to change.

Short Term (0-3 Months – Learning the Process)

- Number of Incidents requiring Problem Management engagement
- Number of Problem Records created
- Number of times trends discovered
- Number of or Percentage of Problems identified through reactive Problem Management
- Number of or Percentage of Problems identified through proactive Problem Management
- Percentage of successful associations between Incidents and Problems
- Percentage of Problem Records Categorized
- Percentage of Problem Records Categorized correctly
- Percentage of Problem Records Prioritized
- Percentage of Problem Records Prioritized correctly
- Percentage of Problem Records investigated
- Percentage of Problem Records diagnosed
- Percentage of Problem Records diagnosed correctly
- Number of times an existing Workaround is assigned to a Problem
- Percentage of Problems with Workarounds assigned
- Number of new Known Errors
- Percentage of Known Errors with documented Workaround
- Number of Incidents associated to a Known Error
- Number of Problems associated to a Known Error
- Percentage of Incidents correctly associated to a Known Error
- Percentage of Problems correctly associated to a Known Error
- Number of or Percentage of Problems by related CI

Medium Term (4-9 Months – Process is maturing)

- Average time to find root cause
- Plans for resolution of open Problems
- Number of documented options for resolving Known Errors
- Time taken to create Workaround
- Number of created RFCs to resolve Known Errors
- Proportion of RFCs to Known Errors
- Number of successful permanent resolutions
- Number of Major Problem Reviews held

Long Term 9+ Months

- Number of or Percentage of Problems by owner
- Number of or Percentage of Problems by status
- Percentage of Major Problem Reviews/Major Problems
- Percentage of Records updated following Major Problem Review
- Percentage of closed Problem Records within timescales
- Percentage of Problems resolved within SLA/OLA targets

POTENTIAL PROBLEM MANAGEMENT PROCESS MEASUREMENTS (KPIS)

- Number of or Percentage of Problems by originating area
- Number of or Percentage of Problems by owner
- Number of or Percentage of Problems by status

PROBLEM MANAGEMENT SUPPORTING DOCUMENTS		
Document Name	**Description**	**Relationship**
Fermilab Problem Management Policy	Policy	Policy
Fermilab Problem Management Process and Procedures	Process	This document
Problem Management Process Metrics	Performance Management Metrics	This Document
Fermilab Incident Management Process and Procedures Appendix 11	Severity Table and Escalation Table	Priority and Urgency guidelines